

B. Claims

Please cancel claims 2, 3, 9-18, 20, 21, 28, 29, 32 and 33 without prejudice or disclaimer and amend claims 1, 4-8, 19, 22-27, 30, 31 and 34 as follows. A complete listing of all the claims appears below; this listing replaces all earlier amendments and listings of the claims.

1. (Currently Amended) An ink jet recording method for ejecting ink, said method using an ink jet head substrate provided with a heat generating resistor, the heat generating resistor being coated with a protection film, wherein the ink is ejected by a pressure produced by generation of a bubble, the bubble being created by film boiling the ink by applying thermal energy to the ink through the protection film, the thermal energy being generated by a driving signal to the heat generating resistor, said method further comprising:

providing a recording mode in which the ink is ejected, the ink having a maximum temperature at the surface of the protection film, which is in contact with the ink, of not higher than 560°C;

controlling the maximum temperature applied to the ink by controlling a pulse width of the driving signal applied to the heat generating resistor; and

measuring a temperature of the substrate, wherein the driving signal to the heat generating resistor is stopped when a discrimination is made that the maximum temperature may exceed 560°C, based on the temperature of the ink and the driving signal.

2. - 3. (Cancelled)

4. (Currently Amended) ★ The method according to Claim 1, wherein the ink contains a chelate agent.

5. (Currently Amended) ★ The method according to Claim 4, wherein the content of the chelate agent is not less than 50 weight ppm and not more than 20 weight %.

6. (Currently Amended) ★ The method according to Claim 1, wherein said protection film comprises a plurality of layers, and the layer that comes into contact with the ink is an anti-cavitation film made of amorphous alloy comprising Ta.

7. (Currently Amended) ★ The method according to Claim 6, wherein the amorphous alloy comprises one or more metal materials selected from the group consisting of Fe, Cr, Re, Ge and Ni.

8. (Currently Amended) ★ The method according to Claim 7, wherein the amorphous alloy comprises Ta, Fe, Cr and Ni, and a content of Ta is not more than 30 weight % on the basis of the total weight of the amorphous alloy.

9. - 18. (Cancelled)

19. (Currently Amended) An ink jet apparatus which includes an ink jet head comprising an ink jet head substrate, said ink jet head substrate including a heat generating resistor, a protection film with which said heat generating resistor is coated, wherein heat generated by said heat generating resistor is applied to ink through said protection film to create a bubble in the ink, to eject the ink by a pressure caused by the creation of the bubble, said apparatus further comprising:

wherein a driving signal control means is provided for making for providing a

maximum temperature at a surface of said protection film that comes into contact with the ink not higher than 560°C during driving of said heat generating resistor, wherein the driving signal control means controls a pulse width of a driving signal applied to said heat generating resistor to control the maximum temperature applied to the ink; and

a temperature detecting element for measuring a temperature of said substrate,
wherein the driving signal to the heat generating resistor is stopped when a discrimination is made that the maximum temperature may exceed 560°C, based on the temperature of the ink and the driving signal.

20. - 21. (Cancelled)

22. (Currently Amended) ~~An~~ The apparatus according to Claim ~~21~~ 19, wherein the ink contains a chelate agent.

23. (Currently Amended) ~~An~~ The apparatus according to Claim 22, wherein the content of the chelate agent is not less than 50 weight ppm and not more than 20 weight %.

24. (Currently Amended) ~~An~~ The apparatus according to Claim ~~21~~ 19, wherein said protection film comprises a plurality of layers, and the layer that comes into contact with the ink is an anti-cavitation film made of amorphous alloy comprising Ta.

25. (Currently Amended) ~~An~~ The apparatus according to Claim 24, wherein the amorphous alloy comprises one or more metal materials selected from the group consisting of Fe, Cr, Re, Ge and Ni.

26. (Currently Amended) ~~Am~~ The apparatus according to Claim 25, wherein the amorphous alloy comprises Ta, Fe, Cr and Ni, and a content of Ta is not more than 30 weight % on the basis of the total weight of the amorphous alloy.

27. (Currently Amended) ~~Am~~ The method according to Claim 1, wherein the heat generating resistor is made of TaSiN.

28. - 29. (Cancelled)

30. (Currently Amended) ~~Am~~ The apparatus according to Claim 19, wherein said heat generating resistor is made of TaSiN.

31. (Currently Amended) ~~Am~~ The method according to Claim 1, wherein the ink contains pigment.

32. - 33. (Cancelled)

34. (Currently Amended) ~~Am~~ The apparatus according to Claim 19, wherein the ink contains pigment.